Thus, the product material channel is intermediate the product material inlet and the product cavity.

In order to produce good quality parts, it is important that the product cavity be neither over-filled nor under-filled with product material. Applicants are concerned with the problem of how to ensure that a correct volume of product material is directed to the product cavity. Applicants have solved this problem by providing an economical means for controlling the filling of the product cavity. More particularly, applicants' tooling assembly includes a flow device assembly and a flow device actuation assembly.

Amended claims 1 and 2 recite that a flow device assembly has a flow channel which is arranged along the product material channel such that the flow path extends through the flow channel. Thus, the flow channel is upstream of the product cavity. The claims also recite that the flow device actuation assembly is operably connected to alter a posture of the flow channel with respect to the product material channel, thereby altering pressure and/or flow rate conditions of the product material in the flow path.

Shah discloses an injection molding apparatus having a plastic injector 12 which may be considered a product material inlet, a sprue or passage 6 which may be considered a product material channel, and a mold cavity or product cavity 58 (column 3, lines 45-54). The product cavity 58 has branches or channels 84, 86 (column 4, lines 5-16), but these channels are not equivalent to applicants' product material channel because the channels 84, 86 do not provide a flow path between the inlet 12 and the cavity 58. Instead, these channels 84, 86 comprise an integral part of the cavity 58. Shah is molding a part having branches which are formed in the channels 84, 86, and Shah is concerned with the problem of how to mold a part having branches which are of unequal length. Shah solves this problem by providing an <u>in-cavity</u> flow regulating means 88 (column 4, lines 51-52) having a flow restricting element

90 which is extendable into the cavity 58 (column 4, lines 59-61) (underlining added for emphasis). Shah does not disclose a flow regulating means arranged along the product material channel 60, as defined in applicants' claims, and Shah does not suggest such an arrangement because it would not provide any benefit for Shah in solving the problem of how to mold a part having branches of unequal length. Therefore, claims 1-2 are believed to be patentable over Shah.

Claim 3 was rejected under 35 USC 103(a) as being unpatentable over Shah in view of Hendry (5,728,410). Amended claim 3 includes the steps of:

(c) altering a posture of the flow channel with respect to the adjacent portions of the flow path so that said flow channel is offset from said adjacent portions of the flow path; and

(d) allowing said product material to solidify in said offset flow channel and said adjacent portions of the flow path whereby said part is formed with an impression of said offset flow channel and said adjacent portions of said flow path,

whereby said solidified material in said offset flow channel is offset with respect to said solidified material in said adjacent portions of the flow path.

Shah discloses a flow restricting element 90 which reduces the cross-sectional area of a flow channel which is part of a flow path in a product cavity. This constriction of the flow channel may be considered to be an alteration of the posture of the flow channel so that said flow channel is offset from adjacent portions of the flow path. Shah does not disclose allowing the product material to solidify in the offset flow channel. The Examiner relies on Hendry for disclosing a product material which is allowed to solidify in a flow channel, and the Examiner states that it would have been obvious to modify Shah by allowing the product material to solidify in the flow channel of Shah.

Applicants respectfully disagree that it would have been obvious to modify Shah in this way. In Shah, the flow restricting element 90 enters a flow channel which is part of the product cavity. Shah does not want the final product to be formed with an impression of the constricted flow channel. Shah teaches that during a final process stage while the plastic material is still flowable, the flow restricting element 90 is fully retracted so that an end face of the element 90 is flush with the contours of the product cavity walls (column 6, lines 1-11). Therefore, Shah teaches exactly the opposite of allowing the product material to solidify so that it is formed with an impression of the offset flow channel, as defined in step (d) of claim 3. Combining Hendry with Shah as suggested by the Examiner would incorporate a defect into the Shah product, and therefore it would not have been obvious to combine the references in this way.

Claim 16 was rejected under 35 USC 103(a) as being unpatentable over Shah. Claim 16 defines that the flow device actuation assembly is rotatable to alter an angle of the flow channel with respect to the product material channel. The Examiner takes the position that it would have been obvious to modify Shah by incorporating a rotatable actuating assembly in place of Shah's linear device because this would allow for a greater range of flow channel variations. Applicants respond that both a rotatable actuating assembly and a linear device can provide a full range of flow channel variations between fully open and fully closed. However, Shah could not be modified to use a rotatable device without affecting the contour of the final molded part, and therefore, a rotatable device is not suitable for use in the apparatus of Shah.

Claim 4 was rejected under 35 USC 102(e) as being anticipated by or, in the alternative, under 35 USC 103(a) as obvious over Hendry. Claim 4 depends from claim 3 and is believed by applicants to be allowable as depending from an allowable independent claim.

The claims presented are believed to be allowable. Reconsideration of the rejections and allowance of the claims are respectfully requested.

Respectfully submitted,

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